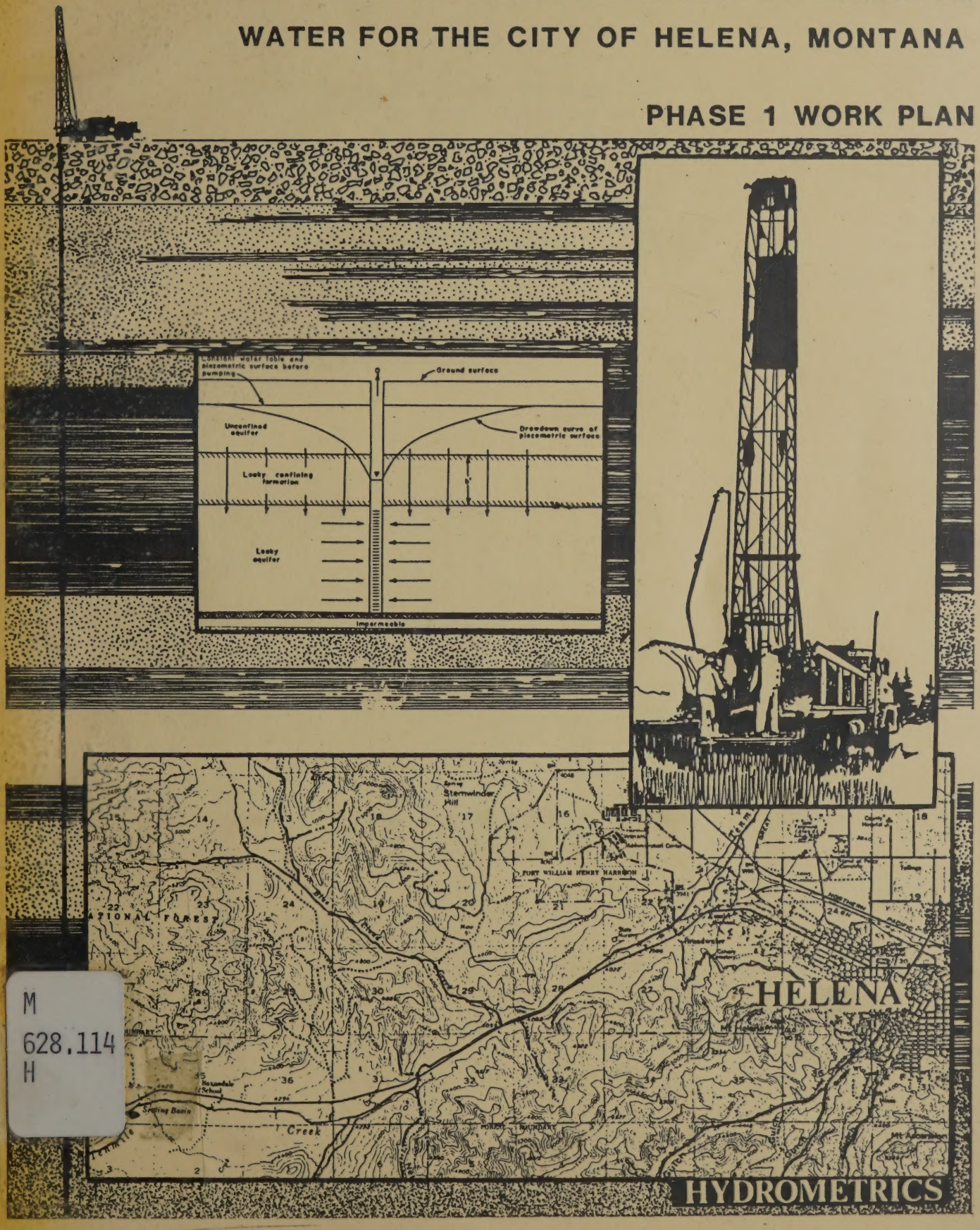
INVESTIGATION OF GROUNDWATER RESOURCES AS A POTENTIAL SOURCE OF MUNICIPAL WATER FOR THE CITY OF HELENA, MONTANA

PHASE 1 WORK PLAN



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PHASE I - WORK PLAN

for

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February 10, 1983

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INTRODUCTION

Increased demand for water in the City of Helena has resulted in the necessity for continued development of additional water supplies. Water treatment needs for the existing Ten Mile system have been evaluated and a proposed Ten Mile treatment plant to treat 15 MGD of surface water obtained from the Ten Mile Creek drainage is estimated to cost 7.2 million dollars. Construction is underway to expand the existing Missouri River treatment plant. Capital costs for improvements to the surface water supplies are very high and operation and maintenance costs are substantial.

There is considerable groundwater in and peripheral to the Helena Valley and in the Ten Mile Creek drainage. Although the community water system uses some groundwater, the potential for development of additional groundwater to supplement the city supply, or the use of groundwater as an alternative to the Ten Mile treatment plant, has never received a detailed technical evaluation.

This proposed groundwater investigation is in response to the request from the City of Helena for a comprehensive evaluation of the area's groundwater resources as a potential source of community water.

Basic questions to be answered in this investigation are:

1) Is groundwater available in sufficient quantity and quality to supplement the existing water supply system or to substitute for the proposed Ten Mile water treatment plant at 9 MGD or 15 MGD?

2) Is the cost of development of groundwater, including capital and maintenance costs, competitive with improvement of existing surface water supplies?

3) What potential problems could occur as a result of development of large quantities of groundwater for municipal use?

A plan for a systematic evaluation of groundwater resources has been developed and is divided into three phases. This proposed work plan is for the Phase I program only. Phase I is an assessment of groundwater development potential in the Helena area and in the Ten Mile Creek drainage and includes a preliminary assessment of costs for developing a 9 MGD to 15 MGD groundwater supply.

The Groundwater Feasibility Steering Committee will review the Phase I report and make recommendations to the City Commission at the conclusion of this investigation.

PHASE I

GROUNDWATER DEVELOPMENT POTENTIAL

For purposes of administration and management, Phase I is subdivided into four tasks.

TASK 1 ASSEMBLY AND REVIEW OF HYDROGEOLOGICAL DATA

This task will involve collection, assembly and review of available geological, hydrological and water quality data for the Helena Valley and the Ten Mile Creek drainage. These data will be obtained from agencies including the Montana Department of Natural Resources and Conservation (DNRC), the U. S. Geological Survey, Montana Bureau of Mines and Geology, the City of Helena, Lewis & Clark County, the U. S. Bureau of Reclamation and from consulting firms which have worked on water resources in this area. These data will be put into a comprehensive project data file.

The DNRC groundwater appropriation file includes some computerized data on appropriations in the Helena Valley and the Ten Mile Creek drainage. Their files also may include some geological logs. Another important source of data on groundwater is local drillers with experience in drilling wells in the area. Information will be obtained from these drillers, including location, depth, geological logs and water yields of wells, particularly high capacity wells.

TASK 2 DATA EVALUATION AND DELINEATION OF AREAS SUITABLE FOR HIGH CAPACITY WELLS

Based on the results of Task 1, hydrogeological conditions in the Helena Valley and in the Ten Mile Creek drainage will be evaluated. This will include plotting existing high capacity wells on maps, delineation of sources of groundwater recharge and discharge, and determination of general directions of groundwater movement. An important part of this task will be to contact owners of reported high capacity wells to verify locations, yields and well construction details. Often, groundwater appropriations filed with the Montana Department of Natural Resources and Conservation and with Lewis and Clark County are inaccurate and must be field checked. As part of this task, short pumping tests of some wells may be conducted to determine well yields.

A map will be prepared delineating areas which may yield large quantities of groundwater. Mapping will be based on geological characteristics and locations of known high capacity wells. The status of hydrological knowledge in areas considered for groundwater development also will be identified. Areas delineated must be near enough to existing or planned water distribution lines to allow economical connection. Due to distance from existing or planned pipelines, it may not be practical to pump from wells in portions of the Helena Valley.

There are several unsubstantiated reports of large groundwater flow in bedrock and in gulches in or near the City of Helena. All available information, including any old publications or newspaper articles on

water within bedrock and nearby gulches, will be reviewed to document the possible existence of these potential groundwater sources.

TASK 3 PRELIMINARY EVALUATION OF GROUNDWATER DEVELOPMENT CONSTRAINTS

This task will be a preliminary evaluation of potential problems and constraints if large quantities of groundwater are pumped for municipal use. This will include assessment of impacts on existing groundwater appropriations, potential problems due to present or future groundwater pollution and acquisition of water rights. To be usable, groundwater needs to be available in suitable quantity and quality, and development must not adversely impact present groundwater users.

This task also will examine the manner in which water from wells would be connected to the municipal water system. Existing and future water supply lines will significantly affect the area potentially suitable for groundwater development. Also, water demands in the distribution system must be understood to best plan connections of new water sources into the system. Particular emphasis will be placed on coordination with the 1983 planned installation of new water mains in Benton and Montana Avenues. These new water mains are needed to accomodate the increased volume of water which will be available in 1984 when expansion of the existing Missouri River treatment plant is completed. Development of a groundwater supply in the Helena Valley potentially may affect the size requirements of these new water mains.

TASK 4. PHASE I REPORT

A comprehensive report will be written describing results of the Phase I investigation and will include a preliminary cost estimate for developing a groundwater system to supply 9 MGD or 15 MGD. All data, maps and information developed in Phase I will be included. The report will contain recommendations for Phase II. Twenty-five copies of the report will be prepared and delivered to the City Commission.

PROJECT ADMINISTRATION, MANAGEMENT AND TIME SCHEDULE

This project will be directed by Mr. M. K. Botz of Hydrometrics. Mr. Botz is a registered professional engineer in Montana and has twenty years of professional experience directing and conducting hydrogeological investigations. Mr. Botz will have some assistance from professional staff in hydrogeology, engineering, drafting, data management and word processing.

The project will begin upon receiving a notice to proceed. It is assumed that the project will start on or before March 1, 1983. The Phase I draft report will be completed by May 30, 1983 and the final report will be completed by June 30, 1983. Information which may affect the size of the proposed Benton and Montana Avenues water mains will be made available as soon as possible in order to accomodate the 1983 construction schedule.

PROJECT MEETINGS

Two meetings will be held with the Groundwater Feasibility Steering Committee during the course of this project. The first meeting will be held upon conclusion of Task 2. The second meeting will be held when Task 4 is completed.

PROJECT BUDGET

The cost of completion of Phase I, Tasks 1 through 4 will be a maximum of $14,500. Billing for the project will be on a time and materials basis and a detailed cost statement will be submitted monthly. Estimated costs for the four tasks are as follows:

TASK 1.	Assembly and Review of Hydrogeological Data.....	$ 1,600
TASK 2.	Data Evaluation and Delineation of Areas Suitable for High Capacity Wells.....	$ 7,200
TASK 3.	Preliminary Evaluation of Groundwater Development Constraints.....	$ 3,600
TASK 4.	Phase I Report.....	$ 2,100
	PROJECT TOTAL...	$14,500